HYUNDAI WELDING

Rev. 02

SF-71

FLUX CORED ARC WELDING CONSUMABLE
FOR WELDING OF MILD & 490MPa CLASS
HIGH TENSILE STEEL

HYUNDAI WELDING CO., LTD.

SF-71

❖ Specification

AWS A5.36	E71T1-C1A0-CS1
(AWS A5.36M	E491T1-C1A2-CS1)
(AWS A5.20	E71T-1C)
EN ISO 17632-A	T 42 0 P C1 1 H10

❖ Applications

All position welding of ship buildings, machinery, bridges, building, vehicles using mild and higher strength steels.

❖ Characteristics on Usage

SF-71 is a titania type flux cored wire for all position welding with CO_2. Compared with solid wire, spatter loss is low, bead appearance is a beautiful and arc is soft with good stability. Slag covering is uniform with good removal.

❖ Note on Usage

1. Proper preheating(50~150℃, 122~302°F) and interpass temperature must be used in order to release hydrogen which may cause cracking in weld metal when electrodes are used for medium and heavy plates.

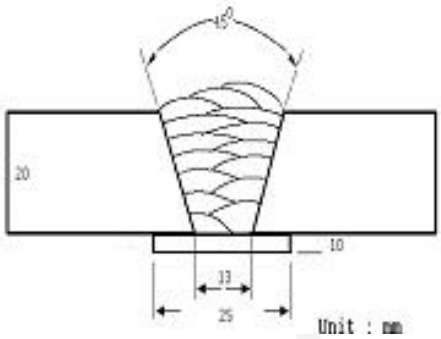
2. One-side welding defects such as hot cracking may occur with wrong welding parameter such as high welding speed.

3. Use 100% CO_2 gas.

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.2mm (0.045in)
Shielding Gas	:	100%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	280A / 32V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
SF-71	YS Mpa (Ksi)	TS Mpa (Ksi)	EL (%)	0℃ (32°F)	-20℃ (-4°F)
	548 (79)	582 (84)	28	86 (63)	50 (37)
AWS A5.36 E71T1-C1A0-CS1	≥ 400 (58)	490~660 (70~95)	≥ 22	≥27J at –20℃ (≥20ft · lbs at 0°F)	

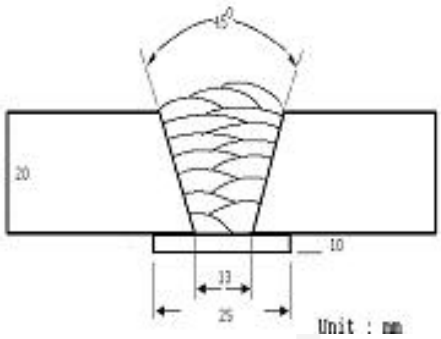
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
SF-71	0.04	0.49	1.29	0.010	0.009
AWS A5.36 E71T1-C1A0-CS1	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.4mm (0.052in)
Shielding Gas	:	100%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	300A / 32V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
SF-71	YS Mpa (Ksi)	TS Mpa (Ksi)	EL (%)	0℃ (32°F)	-20℃ (-4°F)
	538 (78)	575 (83)	27.5	87 (64)	52 (38)
AWS A5.36 E71T1-C1A0-CS1	≥ 400 (58)	490~660 (70~95)	≥ 22	≥27J at –20℃ (≥20ft · lbs at 0°F)	

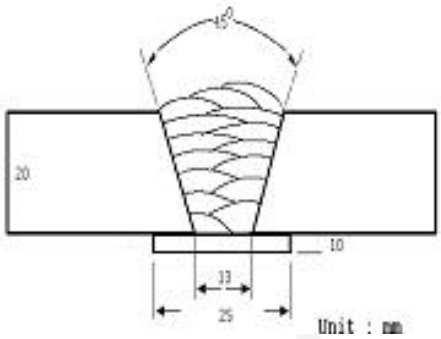
❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
SF-71	0.041	0.52	1.29	0.010	0.008
AWS A5.36 E71T1-C1A0-CS1	≤ 0.12	≤ 0.9	≤ 1.75	≤ 0.03	≤ 0.03

Mechanical Properties & Chemical Composition of All Weld Metal

❖ Welding Conditions

Method by AWS Spec.



[Joint Preparation & Layer Details]

Welding Position	:	1G(PA)
Diameter	:	1.6mm (1/16in)
Shielding Gas	:	100%CO_2
Flow Rate	:	20 ℓ /min
Amp./ Volt.	:	320~330A / 29~30V
Stick-Out	:	20~25mm (0.79~0.98in)
Pre-Heat	:	R.T .
Interpass Temp.	:	150±15℃ (302±59°F)
Polarity	:	DC(+)

❖ Mechanical Properties of all weld metal

Consumable	Tensile Test			CVN Impact Test J(ft · lbs)	
SF-71	YS Mpa (Ksi)	TS Mpa (Ksi)	EL (%)	0℃ (32°F)	-20℃ (-4°F)
	540 (78)	580 (84)	27.5	85 (63)	56 (41)
AWS A5.36 E71T1-C1A0-CS1	**≥ 400 (58)**	**490~660 (70~95)**	**≥ 22**	**≥27J at -20℃ (≥20ft · lbs at 0°F)**	

❖ Chemical Analysis of all weld metal(wt%)

Consumable	C	Si	Mn	P	S
SF-71	0.04	0.50	1.30	0.011	0.009
AWS A5.36 E71T1-C1A0-CS1	**≤ 0.12**	**≤ 0.9**	**≤ 1.75**	**≤ 0.03**	**≤ 0.03**

Welding Efficiency

❖ Deposition Rate & Efficiency

Consumable (size)	Welding Conditions		Wire Feed Speed m/min (in/min)	Deposition Efficiency %	Deposition Rate kg/hr(lb/hr)
	Amp.(A)	Volt.(V)			
SF- 71 1.2mm (0.045in)	200	26	10.2 (400)	84~87	3.4 (7.5)
	250	28	11.5 (450)	85~88	4.5 (9.9)
	300	33	15.3 (600)	86~88	5.2 (11.4)
SF- 71 1.4mm (0.052in)	250	28	7.6 (300)	85~87	3.9 (8.6)
	300	32	10.2 (400)	85~88	4.8 (10.6)
	330	36	12.8 (500)	86~89	5.8 (12.8)
SF- 71 1.6mm (1/16in)	280	31	6.4 (250)	85~88	4.2 (9.2)
	330	33	7.6 (300)	86~88	4.8 (10.6)
	350	34	8.1 (320)	87~89	5.3 (11.7)
	400	38	9.2 (360)	87~90	5.7 (12.5)
Remark				Deposition efficiency =(Deposited metal weight/ Wire weight used)×100	Deposition rate =(Deposited metal weight/ Welding time,min.)×60

* Shielding Gas : 100%CO_2

Diffusible Hydrogen Content

❖ Welding Conditions

Diameter	:	1.4mm (0.052in)	**Amps(A) / Volts(V)**	:	240A / 27V
Shielding Gas	:	100%CO_2	**Stick-Out**	:	20~25mm (0.79~0.98in)
Flow Rate	:	20 ℓ /min			
Welding Position	:	1G (PA)	**Welding Speed**	:	30 cm/min (12 in/min)
			Current Type & Polarity	:	DC(+)

❖ Hydrogen Analysis Using Gas Chromatography Method

Hydrogen Evolution Time	:	72 hrs
Evolution Temp.	:	45 ℃ (113°F)
Barometric Pressure	:	780 mm-Hg

❖ Result(㎖/100g Weld Metal)

X1	X2	X3	X4
6.0	**6.4**	**5.9**	**6.2**

Average Hydrogen Content 6.1 *㎖ / 100g Weld Metal*

Proper Welding Condition

❖ Proper Current Range

Consumable	Shielding Gas	Welding Position	Wire Dia.		
			1.2mm (0.045in)	1.4mm (0.052in)	1.6mm (1/16in)
SF-71	100%CO_2	F & HF	120~300Amp	200~350Amp	200~400Amp
		V-Up & OH	120~260Amp	180~280Amp	180~280mp
		V-Down	200~300Amp	220~320Amp	250~320Amp

Approvals

❖ AUTHORIZED APPROVAL DETAILS

Welding Position	Register of shipping & Size						
	KR	ABS	LR	BV	DNV	GL	NK
All V-Down	2SMG, 2YSMG ©H10 1.2~1.6mm (0.045~1/16in)	2SAH10, 2YSA 1.2~1.6mm (0.045~1/16in)	2S, 2YSH10 1.2~1.6mm (0.045~1/16in)	SA2M,2YMHH A2,2YMHH 1.2~1.6mm (0.045~1/16in)	IIYMSH15 1.2~1.6mm (0.045~1/16in)	2YH10S 1.2~1.6mm (0.045~1/16in)	KSW52Y40G ©H10 1.2~1.6mm (0.045~1/16in)

❖ F No & A No

F No	A No
6	1